To: Ron Ott
From: Bruce Herbold, Susan Hatfield and Carolyn Yale, EPA
Re: Analysis of the Impacts of CalFed Alternatives on Fishery Resources

Substantive

p1, para. 2. This paragraph should set the stage for integration of the common programs and the conveyance alternatives. The underlying question which must be answered is what can be done for the fish populations relying on the Delta in the absence of additional facilities, and then how much benefit will each facility contribute. Since different actions will provide different benefits to different species, the integration of all of these is difficult, as this paragraph points out. However, if approached species by species, and as a series of hypotheses which are strongly supported or weakly supported, as the case may be, it will be more useful. This does not have to be a long discussion, but does need to include enough information to make the case clearly and believably.

pp 2 & 3. The water use efficiency common program should be included (see below).

p7, para 2. Alternative 1. The possibilities for increased water use efficiency and increased storage for environmental use do not appear to be fully included in this analysis. This assessment assumes an increased level of demand (9% relative to no action and 14% relative to current) for all three conveyance alternatives. However, balancing competing uses for water in Alternative 1 is different than for Alternative 3, and would probably entail greater investment in demand management, hence lowering demand. Optimization of Alternative 1 is likely to address water supply needs in part through reclamation and conservation assistance, a regulated/mitigated transfer market, etc.

Figure 1 is not a representation of IDT's alternative 1 because it doesn't include the south delta barriers. Thus, the net flows shown in the central and south delta are incorrect.

The legend describes the numbers as "Average Tidal Flows" which is not correct, they are net flows over an averaged tidal condition. Work by DWR and UCD with particle tracking models and by USGS with measured flows have convinced many that net flows in the western delta are of very limited interest because of tidal flow impacts. Discussion of 'drafting' of eggs and larvae by these net flows should follow some review of particle tracking modeling results.

The area in which net flows are of the greatest interest is the northern delta. Much heated discussion has focused on transport of egg and larval striped bass and delta smelt as a function of river flow in the north delta. None of these impacts are discussed as they differ among the three alternatives and the flows are not even included in

Figures 1-3. The technical appendix upon which this document is based also fails to review these impacts although the flow data and quantitative estimates of needs are readily available.

Figure 1-3 are based on October conditions in a very dry year. Figure 1 is treated as if it were also existing conditions for impacts on eggs and larvae. Because the WQCP addresses (mostly) conditions in the biologically important period of February-June, such use of Figure 1 is misleading since the size of net flows, their direction, their relative size compared to other net flows, etc. are drastically different than presented here. This becomes crucial when efforts are made to compare existing conditions or no action alternatives with the benefits of each alternative.

The benefits of each alternative presented in the bar graphs are not supported by the text. The bargraphs lack a y-axis but they lead to the conclusion that some alternatives are substantially better than others -- unless some justification can be given the bargraphs should not be included. However, the effort of the bargraphs should be pursued, but for identified species or groups of species and with mechanisms of effects identified. For instance:

Striped bass:

> Assume 1) that 80% of spawning occurs near Knights Landing and 2) that mortality of eggs and larvae above Rio Vista is a function of river flow (as DFG's long-standing comments re the I St Bridge flows) and 3) that mortality rates are high for eggs and larvae and 4) that exposure of E&L to screens at Hood would be a one-time thing and in proportion to flow diverted whereas exposure to South Delta facilities is a function of the residence time of water in the central delta (which probably decreases as reverse flows get worse): Then impacts of each alternative on striped bass E&L can be calculated from

.80* (proportion diverted at Hood) - (Hood bypass flows*coefficient from DFG) - .20*(residence time/growth rate*age specific mortality rates)

Sacramento Salmon:

> On page 8 the authors lay out a reasoning why alternatives 1 and 3 should have similar impacts on Sacramento Salmon and yet the bar graph shows substantial improvements for alternative 1 over the common program and alternative three is double the improvement of alternative 1. If not for salmon (or for striped bass, following the above reasoning) than for which species could the bargraph apply?
>
> I don't know if the outmigration cues used by salmon are related more to flow volumes in the rivers or to reverse flow condition in the central delta but I suspect that for smolts entering the delta it is the size of the bypass flow that orients them to downstream and would get them past Hood or the DCC, or

Georgiana; at low flows they are probably exposed to diversion into the central delta over many more tidal cycles than at high flows. Thus, an equation like that for striped bass could be rapidly developed to support the alternatives analysis.

The X2 analysis must present more data than averages of many years. Even during the 1987-92 drought there was substantial occasional movement of X2. A crucial question is to compare the range of X2 values in the various alternatives.

The X2 analysis is the only place that the fishery benefits or impacts of additional storage is discussed (other than a sentence on P. 7). A more complete discussion should be included, especially in relation to upstream effects and support of ERPP actions.

On page 3 the unsubstantiated claim that Sacramento salmon will benefit more from upstream work than delta work will not be accepted by many people, likewise the claim that the reverse is true for San Joaquin salmon. In the delta each has been shown to have different degrees of sensitivity but the relative roles of upstream on each side vs delta conditions is nowhere near resolved.

Figure 2 and the text on page 6 suggests that the DCC will be closed permanantly. Is that true?

p9 2nd para. Fishes included in group 1 generally have this behavior, but salmon (and steelhead) are in group 1 and would be entirely different.

Editorial

p2 top. White catfish seems out of place in group 1, why not group 2? What about inlcuding threadfin shad in the discussion of group 2 as a planktivore that is heavily entrained but which seems to survive high entrainment rates.

p2 5th line "and are thus have"

p2 3rd paragraph "all will benefit," This is only true for whatever species might be food limited in the estuary, certainly not "all."

p2 4th paragraph "much more likely to migrate to the estuary in wet years" Bill Snider's information from the American indicates that a high percentage (90 to 70%) of salmon rear downstream of the confluence with the Sacramento, and not just in wet years. This should be changed to reflect the probable importance of the downstream areas for salmon rearing in many, if not most years.

p3, 3rd para. 'minimum flows' should be changed to "flow regimes." Splittail, American shad, sturgeon and Central Valley natives shuch as hardhead and blackfish will also

benefit.

P3, 5th para. A sentence should be added: "It is likely that some restoration actions will help mitigate the negative effects of exotic species on native populations. For instance, removal of large gravel pits from streambeds should help reduce centrarchid predation on salmonid juveniles."

p4 3rd para. "the present __ cfs diversions" seems to be missing a number.

p6 middle paragraph - Treatment of tidal flows vs net flows is not clear. Net delta outflow is usually trivial in the face of tidal flows at Chipps Islands and dispersion of particles is almost independent of river flow at that location. It therefore doesn't make a case that net flows are important to say that some are as large as net delta outflow, especially since under the WQCP that is true only at times of minimal sensitivity such as October.

p 8.first complete Para. Not obviously true that greater exports would increase conflict with SJ water quality. CCWD has argued that higher exports ensure good water at their diversion and the WUE program and CVPIA land retirement program should do a lot to addressing inflow WQ on the San Joaquin.

p9 2nd para "Fishes included in Group I general have this behavior,"
cues not "queues"

p10 1st para. effects not "affects"

p10 4th bullet Does any evidence support this assertion?

p11 There seems to be some disagreement within this paragraph about the uses of flow and X2. Certainly, bay shrimp and starry flounder are unlikely to see any physical manifestation of "downsteram river flow."